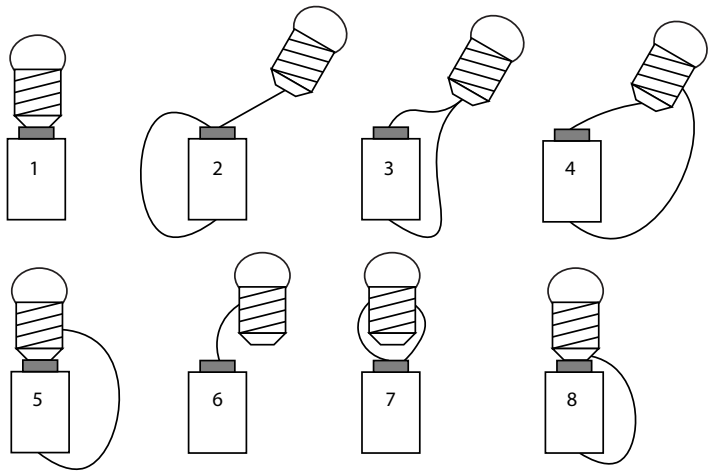
Lab 11: Current Electricity

1. Each of the diagrams below contains a light bulb connected to one or two batteries with either zero, one, or two wires



   (a) Which of these arrangements should cause the light bulb to light? Explain why for each one you choose.

   (b) For the arrangements you don't think will light the bulb, why do you think it won't?

2. Now you will test your predictions. Assemble each of the arrangements above and observe if the bulb lights.

   (a) Were your predictions correct?

   (b) What conditions do you think need to be satisfied in order for the bulb to light?

Your instructor will now lead a class discussion about this experiment.

3. Your instructor should have told you that in order for the bulb to light, there needs to be a continuous loop from one end of the battery, through the filament, and to the other side of the battery (this is called a *closed circuit*). On your handout, there is a picture of a lightbulb connected to a battery. Clearly mark the closed circuit on this drawing.

4. There are four arrangements with the lightbulb, battery, and one wire that will light the bulb, and two using two wires. Draw these on your handout (HINT: try reversing the direction of the battery).

5. In addition to your lightbulb, battery, and wires, you have been given a switch. Use the components you have to create a circuit in which the bulb lights when the switch is closed and turns off when it is opened. Draw this circuit on your handout. The circuit that results when the switch is opened is and *open circuit*.

6. Now make a circuit in which the bulb is lit when the switch is *open* and turns off when the switch is closed. Draw it on your handout. Closing the switch in this circuit creates a *short circuit* (CAUTION: Only close the switch to short the circuit long enough to see that the lightbulb goes out. Leaving it "shorted" can run down the battery very quickly!)

7. You have also been given a flashlight. Examine the flashlight and sketch a picture of it on your handout, making sure to show the circuit that turns it on and off when the switch is used.

8. You have been given a bag with a number of different materials. You are going to be inserting them into your circuit (as demonstrated by your instructor) in order to determine if they will allow electricity to flow through them to light the bulb.

   (a) *Predict* which items will allow the bulb to light. (List them below)

   (b) *Predict* which items will not allow the bulb to light. (List them below)

   (c) Were your predictions correct? If not, which items were you wrong about?

   (d) The items that allowed the bulb to light should share some common characteristics. List of few of them here.